1.1000

67053

SOV/85-60-1-25/53

AUTHOR: Tsvelev, V., Leading Designer

TITLE: The Yak-18P

PERIODICAL: Kryl'ya rodiny, 1960, Nr 1, pp 17-18 and p 4 of center fold (USSR)

ABSTRACT: The author describes the recently tested Yak-18P, an aircraft designed by A.S. Yakovlev on the basis of the Yak-18A. Its specifications are as follows:- wing-span 10.6 m; length 8.18m; height 3.25 m; wing area 17 m^2; mean aerodynamic chord 1,686 m; tail-plane unit area 3.185 m^2; rudder-fin unit area 1.575 m^2; diameter of propeller 2.3 m; full flying weight 1,065 kg; weight when empty 918 kg; fuel capacity 45 kg; horizontal ground speed 275 kmph; maximum air speed 390 kmph; initial rate of climb 10 mps; service ceiling 6,500 m; take-off speed 100 kmph; landing speed 95 kmph; length of take-off run 120 m;

Card 1/5

The Yak-18P

length of landing run 200 m; endurance on a 60 liter fuel reserve 50 minutes. The aircraft was tested at the Tsentral'nyy aeroklub SSSR imeni V.P. Chkalova (USSR Central Aeroclub imeni V.P. Chkalov). It is equipped with a 9-cylinder air-cooled 260 hp AI-14R engine. The propeller is a twin-bladed wooden V530 D35 with variable pitch. The instrument panel layout is: engine, propeller, landing-flap and air-cock controls on the right and VHF radio unit and emergency undercarriage let-down controls on the left. The wing is of sectional construction and contains the fueltanks. The metallic, fabric-covered slotted ailerons have 22% axial compensation and weight balance. There is a Shrenk-type all-metal landing-flap. The fuselage comprises a frame and a covered decking. The covering is of duraluminum and there are ports for free access to cabin installations.

Card 2/5

The Yak-18P

The tail section is fabric covered and comprises a stabilizer, elevator, verticle fin and rudder. There is a retractable undercarriage with air-hydraulic shock-absorption, a 400 x 150 front wheel and two 500 x 150 brake wheels. The elevator can move upwards through 20^0 and downwards through 25^0. The rudder has a D-1 differential gear and can be adjusted within limits of 140 mm. The trimmer is cable-controlled. The undercarriage is cable-operated through a PU7 relief valve.[3] The brake system consists of an AK-50M compressor, 2 - 12 liter cisterns with an emergency capacity of 3 liters, valves, filters and cocks. The engine control system incorporates governors for rated gas, the altitude corrector, the propeller pitch regulator, the fire plug, the carburettor air-intake flap, the peripheral gills and the oil radiator outlet.

Card 3/5

The Yak-18P

The fuel system? has a capacity of 138 liters and consists of 2 main tanks, a pump, a fire plug, a fuelometer, an engine primer and a duct valve system. Fuel flows from the main tank into the 9 liter supply tank, is pumped into the reserve tank and thence enters the carburettor. A drop (valve) feed device permits inverted flight for 5 minutes at 2,000 rpm (normal flight). The source of electrical energy is a 1,500 kw GS-1500 generator and a 10 amps per hour 12A-10 accumulator. In divergence from the Yak-18A angle of the stabilizer setting is + 1° and centering is 29.7% SAKh. The aircraft's oil-feed system comprises a main tank and a "breathing" tank, oil pumps, an oil radiator, an oil filter and an oil-pocket feed-pipe and hose system. Oil is drawn from the oil and drainage tanks with the help of a 360° oil and air intake. From the outer engine the

Card 4/5

The Yak-18P

oil flows into the oil reservoir (the lowest point of the oil-system), transverses the radiator and returns to the tank. Engine control is assisted by a device for measuring oil and gasoline pressure, the temperature of oil entering the engine and the temperature of the cylinder-heads. The test took place at the Tsentral'nyy Aeroklub SSSR imeni V.P. Chkalova (Central Aeroclub of the USSR imeni V.P. Chkalov). There is 1 photograph and 1 schematic diagram. 4

Card 5/5

L 21132-66 EWT(m)/EWA(d)/EWP(j)/T/EWP(t)/ETC(m)-6 IJP(c) JD/WW/DJ/RM
ACC NR: AP6009870 (A) SOURCE CODE: UR/0413/66/000/004/0068/0068

INVENTOR: Fialkov, A. S.; Tsvelikhovskiy, G. I.; Temkin, I. V.; Baver, A. I. 42 B

ORG: none

TITLE: Preparation of antifriction material. Class 39, No. 178977

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 4, 1966, 68

TOPIC TAGS: antifriction material, lubrication, phenolformaldehyde material, wear resistant material, graphite additive

ABSTRACT: An Author Certificate was issued for a method of preparing an improved antifriction material composed of cord fabric and phenolformaldehyde resin. Wear resistance of the material is increased by heat treatment at up to 1000C and the antifriction property is enhanced by addition of graphite to the resin. [JK]

SUB CODE: 11/ SUBM DATE: 24Jul63/ ATD PRESS: 4222

Card 1/1 UDC: 621.893:678.623'32'21

TSvelodub, B.I., inzh.

Komsomol'sk- Sovetskaya Gavan' Line. Transp. stroi. 15 no.6:
57-59 Je '65. (MIRA 18:12)

GOL'DMAN, M.S.; TSVELODUB, B.I.

Improve the standard of the mechanization of track work. Transp. stroi. 14 no.7:1-2 Jl '64. (MIRA 18:1)

1. Zamestitel' nachal'nika Tekhnicheskogo upravleniya Gosudarstvennogo proizvodstvennogo komiteta po transportnomu stroitel'stvu SSSR (for Gol'dman). 2. Rukovoditel' otdeleniya TSentral'nogo nauchno-issledovatel'skogo instituta svyazi (for TSvelodub).

TSVELODUB, B.I., inzh.; CHERNAVSKIY, V.P., inzh.

Building railroad fills with stabilized slopes. Transp. stroi. 14 no.7:3-5 Jl '64. (MIRA 18:1)

TSVELODUB, B.M., inzh.

Stabilizing the slopes of roadbeds in Austria. Transp. stroi. 14 no.9:55 S '64 (MIRA 18:1)

BORKHVARDT, V.S.; DROZDOVA, I.N.; ZAKHAREVICH, S.F.; KOZLOVSKAYA, N.V.; MARKOVSKAYA, L.A.[deceased]; MILYAYEV, N.A.; MURAV'YEVA, O.A.; SERGIYEVSKAYA, Ye.V.; SOKOLOVSKAYA, A.P.; STANISHCHEVA, O.N.; TAKHTADZHYAN, A.L.; FLOROVSKAYA, Ye.F.; TSVELEV, N.N.; SHISHKIN, B.K., prof.[deceased]; SHMIDT, V.M.; DUBROVSKAYA, I.P., red.

[Flora of Leningrad Province] Flora Leningradskoi oblasti. Leningrad. No.4. 1965. 356 p. (MIRA 18:9)

1. Leningrad. Universitet. 2. Chlen-korrespondent AN SSSR (for Shishkin).

BORISOVA, A.G.; IL'IN, M.M.; KLOKOV, M.V.; LINCHEVSKIY, I.A.; POBEDIMOVA, Ye.G.; SEMIDEL, G.L.; SOSKOV, Yu.D.; SOSNOVSKIY, D.I.; TAMAMSHYAN, S.G.; KHARADZE, A.L.; TSVELEV, N.N.; CHEREPANOV, S.K.; SHOSTAKOVSKIY, S.A.; BOBROV, Ye.G., doktor biol. nauk, prof., red. toma; SHISHKIN, B.K., red. izd. [deceased]; SMIRNOVA, A.V., tekhn. red.

[Tribes Cynareae and Mutisieae.] Kolena Cynareae i Mutisieae. Moskva, 1963. 653 p. (Akademiia nauk SSSR. Botanicheskii institut. Flora SSSR, vol.28). (MIRA 16:12)

ACCESSION NR: AT4002660 S/2531/63/000/149/0053/0061

AUTHOR: Tsverava, V. G.

TITLE: Storms on the Baltic Sea and their relationship to elemental synoptic processes

SOURCE: Leningrad. Glavnaya geofizicheskaya observatoriya. Trudy*, no. 149, 1963. Voprosy* prikladnoy klimatologii, 53-61

TOPIC TAGS: meteorology, climatology, storm, Baltic storm, Baltic weather, seasonal storm, Baltic seasonal storm, Baltic storm intensity, Baltic storm frequency, elemental synoptic process

ABSTRACT: The author examined the interdependence of storm activity on the Baltic Sea and the type of macrosynoptic processes arising in the Northern Hemisphere. The work of the Hydrometeorological service on the Baltic Fleet is cited. Typical synoptic processes (G. Vangengeym) employed in making long-range forecasts are discussed and methods of studying synoptic processes and storm activities according to data collected by a number of coastal and island stations for the years 1953-1957 are reviewed. An attempt is made to determine the relationship between elemental synoptic processes and storm activity with seasonal subdivisions of

Card 1/2

ACCESSION NR: AT4002660

storms and their intensities. A concise description of synoptic conditions which are characteristic of storm development on the Baltic Sea is given. On the basis of a study of 189 storms during a five-year period, it is concluded that storm activity is closely allied with the characteristic development of macroprocesses in the Northern Hemisphere. The origin and the development of storms was, in most cases, found to occur with a western form of circulation. Tables illustrating subdivisions of elemental synoptic processes according to Vangengeym, tables of storm distribution depending on time of year and the macroprocesses, and a table of seasonal distribution of storms at different sites in the Baltic Sea are included. Conclusions are of a preliminary character. Orig. art. has: 3 tables and 2 figures.

ASSOCIATION: Glavnaya geofizicheskaya observatoriya, Leningrad (Main Geophysical Observatory)

SUBMITTED: 00 DATE ACQ: 14Jan64 ENCL: 00

SUB CODE: ES NO REF SOV: 005 OTHER: 000

Card 2/2

MIKHEYEVA, O.N.; ZHABRONOVA, Z.A.; POPOVA, L.A.; KAMENSKIY, I.N. [deceased]; BEL'KIND, M.G.; TSVELEVA, I.A.; SMOL'NAYA, L.M.; KADYKOVA, N.F.; KASHITSYNA, A.D.

Biosynthesis of tetracycline on enriched media. Med.prom. 14 no.1:31-34 Ja '60. (MIRA 13:5)

1. Moskovskiy zavod meditsinskikh preparatov No.1 i Vsesoyuznyy nauchno-issledovatel'skiy institut antibiotikov.
(TETRACYCLINE)

TSVELIKH, M.G.

Scientific criticism expressed in the classics of Russian physics. Nauk. zap. Kiev. un. 13 no.7:5-11 '55. (MLRA 9:12)

(Physics)

TSVELIKH, Petr Timofeyevich [TSvelykh, P.T.]; ZARVA, L., red.; TSURKAN, P., tekhn. red.

[The development of production relations during the transition of communism] Rozvytok sotsialistychnykh vyrobnychykh vidnosyn v period perekhodu do komunizmu. Kyiv, Derzh.vyd-vo polit.lit-ry URSR, 1960. 126 p. (MIRA 14:12)
(Russia—Economic conditions) (Russia—Economic policy)

PREOBRAZHENSKIY, B.K.; TSVELIKHOVSKIY, V.P.; MEL'NIKOV, V.N.

Ion-exchange separation of groups of elements. Part 4: Elements of analytical group III. Radiokhimiia 2 no.1:73-77 '60. (MIRA 14:5)
(Ion exchange) (Chemistry, Analytical)

S/186/60/002/001/012/022
A057/A129

AUTHORS: Preobrazhenskiy, B.K.; Tsvelikhovskiy, V.P.; Mel'nikov, V.N.

TITLE: Ion-exchange separation of a group of elements. IV. Elements of the III. analytical group

PERIODICAL: Radiokhimiya, v. 2, no. 1, 1960, 73 - 77

TEXT: In the present paper a new method of ion-exchange separation for the elements of the third analytical group is described. It can be applied in radiochemistry (to the preparation of elements with or without carrier), or analytical chemistry. Many investigations were already made to separate some elements of this group, but if separation from a more complex mixture has to be carried out, none of these methods can be used without knowing the behavior of the other elements. In the present paper the following references are given: Ref. 1: D.I. Ryabchikov and V.Ye. Bukhtiyarov, ZhAKh, 9, 196 (1954); Ref. 4: I.P. Alimarin, Ye.P. Tsintsevich, Zav. lab., 21, 29 (1955); Ref. 6: A.K. Lavrukhina, DAN SSSR, 119, 56 (1958); Ref. 7: B. Lister, J. Chem. Soc., 3123 (1951); Ref. 8: E. Huffman, J. Am. Chem. Soc., 73, 4474 (1951); Ref. 12: O.V. Al'tshuler et al., ZhNKh, 3, 1192 (1958); Ref. 13: T.A. Belyavskaya et al., ZhAKh, 13, 668 (1958);

Card 1/6

Ion-exchange separation of a group of elements. IV....

Ref. 15: D.I. Ryabchikov, and V.F. Osipova, ZhAKh, 11, 278 (1956). Developing the present method the authors considered two principles: 1) Selection of a special selective complex-forming agent for each element, and 2) selection of conditions for the separation with varying concentrations of a single complex-forming agent. In order to avoid hydrolysis of some of the investigated elements, only mineral acids were used as elutriants. Hydrochloric acid solutions were used to study chloride complexes. It was observed, however, that data given by K. Kraus and F. Nelson have to be checked. The present experiments were carried out with the КУ-2 (KU-2) sulfo-styrene cation excharge resin (~6% divinylbenzene content, capacity 4.7 mg equiv/g) and the strongly basic АВ-17 (AV-17) anion-exchange resin, or Dowex-1. The resins were used in H^+ or Cl^- form, and d = 2 mm, l = 70 - 100 mm columns were used. Flow rates of about 1 drop/min were maintained and the separation was controlled by means of radioactive isotopes or spot tests. Some details concerning the technique are described in previous papers [Ref. 18: ZhNKh, 3, 119 (1958); Ref. 19: ZhNKh, 2, 1164 (1957); Ref. 20: Radiokhimiya, 2, 1, 68 (1960)]. The first experiments demonstrated that the elements investigated cannot be separated using only one ion-exchange resin, but cation- and anion-exchange resins must be used. The following method was developed by the present authors: the concentrated hydrochloric acid solution containing the mixture of

Card 2/6

Ion-exchange separation of a group of elements. IV....

all the elements is passed through the column with the anion-exchange resin. The elements which form anionic complexes are adsorbed, and thus two sub-groups are separated. The elements adsorbed on the anion-exchange resin were removed selectively by varying the HCl concentration (corresponding to the constant of the anion complex). The elements which are not adsorbed by the anion-exchange resin were passed into the column with the cation-exchange resin and were then removed selectively. The conditions for the partition of the elements are presented in Figures 1, 2 and 3. If rare earths have not been removed preliminarily, they can be washed out quickly with 5 N HNO_3 after elution of aluminum and are separated by special methods (Refs. 18, 19). Fe and Ga are removed from the anion-exchange resin together and can be separated later on the cation-exchange resin according to the greater tendency of iron to form neutral complexes (like $FeCl_3$) or the less dissociated $HFeCl_4$ (compared to $HGeCl_4$). Ni^{2+} and Tl^{+} are removed almost together. Oxidizing the latter by saturating the elutriant with chlorine, Tl^{+} can be removed before Ni^{2+}. Thorium must be removed by sulfuric acid from the cation-exchange resin. Elements separated on the cation-exchange resin do not form anionic complexes in HCl solutions, even here separation occurs due to selective formation of mainly neutral complexes. Thus Ni and Tl can be removed from the cation-exchange resin with 1 M HCl solution, but not with 1 M HNO_3 solu-

Card 3/6

Ion-exchange separation of a group of elements. IV....

tion, i.e., the anion of the acid is important, indicating that complex formation occurs. The adsorption of several elements on the cation-exchange resin stops already in 2.5 M HCl solution and they can be removed although they do not form anionic complexes. This indicates formation of neutral complexes, for instance of the type $[MeCl_x]^o$, for the elements Cr^{3+}, V^{4+}, Ni^{2+} and Tl^{+}. Cr^{3+} forms a stable neutral complex. Thus chromium can be easily separated from all other elements. This can be applied to serial analyses of metals, etc. The three references to recent English-language publications read as follows: Ref. 3: K. Kraus et al., J. Phys. Chem., 58, 11 (1954); Ref. 5: K.A. Kraus, G. Moore, J. Am. Chem. Soc., 75, 1460 (1953); Ref. 9: J. Benedict et al., J. Am. Chem. Soc., 76, 2036 (1954). There are 3 figures, 1 table and 19 references: 10 Soviet-bloc and 9 non-Soviet-bloc.

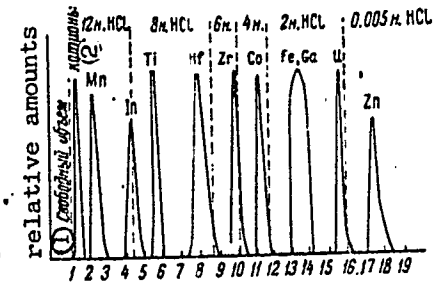

Figure 1: Separation of the elements of the III group, adsorbed by the anion-exchange resin from concentrated HCl (anion-exchange resin of AV-17 type or Dowex-1). ① free volume; ② cation.

Card 4/6

NASEDKIN, I.F., kand.tekhn.nauk; TSVELODUB, B.I., inzh.

Issuing a draft of Technical Norms and Specifications for Permafrost Regions. Transp.stroi. 9 no.10:50-53 O '59. (MIRA 13:2)

(Frozen ground) (Railroads--Specifications)

TSVELODUB, B.I., inzh.; CHERNAVSKIY, V.P., kand.tekhn.nauk

New instructions on the techniques of building an earth roadbed. (MIRA 15:6)
Transp. stroi. 12 no.5:48 My '62.
(Railroads—Earthwork)

NASEDKIN, I.F., kand.tekhn.nauk; TSVELODUB, B.I., inzh.;BRUKVA, N.A., inzh.

Steadily raise the technical level of building the super-structure. Transp. stroi. 12 no.8:10-12 Ag '62. (MIRA 15:9)
(Railroads—Construction)

SESSAREVSKIY, A.N., inzh.; TSVELODUB, B.I., inzh.

Continuous track in the construction of new railroads. Transp. stroi. 12 no.10:10-13 O '62. (MIRA 15:12)
(Railroads--Track)

TSVELODUB, B.I.; YAKOVLEVA, Ye.A., starshiy nauchnyy sotrudnik

Requirements for roadbeds in laying continuous tracks. Transp. stroi. 13 no.9:49-51 S '63. (MIRA 16:12)

1. Rukovoditel' otdeleniya zemlyanogo polotna i verkhnego stroyeniya puti Vsesoyuznogo nauchno-issledovatel'skogo instituta transportnogo stroitel'stva (for TSvelodub).

TSVELODUB, B.I.; YAKOVLEVA, Ye.A., starshiy nauchnyy sotrudnik

Requirements for roadbeds in laying continuous tracks. Transp. stroi. 13 n .9:49-51 S '63. (MIRA 16:12)

1. Rukovoditel' otdeleniya zemlyanogo polotna i verkhnego stroyeniya puti Vsesoyuznogo nauchno-issledovatel'skogo instituta transportnogo stroitel'stva (for TSvelodub).

FLEYSHMAN, S.M., kand.tekhn.nauk; TSVELODUB, B.I., inzh.; TSELIKOV, F.I., inzh.

Laying out railroad beds on rocky slopes. Transp.stroi. 10 no.7:36-39 Jl '60. (MIRA 13:7)
(Railroads—Earthwork)

TSVELODUB, B.I., inzh.

Railroad construction in Quebec. Transp. stroi. 11 no.8:52-53 Ag '61. (MIRA 14:9)
(Quebec Province--Railroads--Construction)

TSVELODUB, B.I.

"Roadbeds of foreign railways" by N.G.Gryshevoi. Reviewed by B. I. Tsvelodub. Transp. stroi. 11 no.10:58-59 O '61. (MIRA 14:10)

1. Rukovoditel' otdeleniya sooruzheniya zemlyanogo polotna i verkhnego stroyeniya puti Vsesoyuznogo nauchno-issledovatel'skogo instituta transportnogo stroitel'stva.
(Railroads--Earthwork)
(Gryshevoi, N.G.)

GOL'DMAN, M.S., inzh.; PROKHOROV, D.V., inzh.; TSVELODUB, B.I., inzh.

Practices in laying tracks without joints in the Hungarian People's Republic. Transp. stroi. 14 no.8:52-54 Ag '64. (MIRA 18:1)

SAATCHYAN, G.G., kand.tekhn.nauk; TSVELODUB, B.I., inzh.

Improving the quality of roadbed construction. Transp. stroi. 9 no.7:17-21 Jl '59. (MIRA 12:12)
(Railroads--Earthwork)

TSVELODUB, B.I.

Let's raise the quality of designing and building an earth railroad bed over difficult terrain. Transp. stroi. 12 no.4:10-13 Ap '62. (MIRA 15:5)

1. Rukovoditel' otdeleniya sooruzheniya zemlyanogo polotna i verkhnego stroyeniya puti Vsesoyuznogo nauchno-issledovatel'skogo instituta transportnogo stroitel'stva.
(Railroads--Earthwork)

TSVELODUB, V.P., kand. tekhn. nauk

Ability of dyed fabrics to transmit ultraviolet rays. Tekst. pron. 19 no.11:63-65 N '59. (MIRA 13:2)
(Ultraviolet rays) (Textile fabrics--Testing)

TSVELODUB, V.P.

Effect of fabric colors on the filtering of ultraviolet rays.
Izv.vys.ucheb.zav.; tekh.tekst.prom. no.2:19-27 '59.
(MIRA 12:6)

1. L'vovskiy torgovo-ekonomicheskiy institut.
(Textile fabrics--Testing)
(Ultraviolet rays)
(Dyes and dyeing--Chemistry)

USSR/Optics K

Abs Jour. Referat Zhur-Fizika, 1957, No. 4, 10644

Author : Tsvelodub, V.P.
Inst : Not Given
Title : Concerning the Connection Between the Color of the Dye and the Transparency of Colored Cloth for Ultraviolet Rays.

Orig Pub: Dokl. L'vovsk. politekhn. in-ta, 1955, 1, No 2, 19-22

Abstract: Specimens of the cloth "bleached shirting" measuring 200 x 200 mm were intensely dyed by commercial direct azo-dyes: blue-diaminogen No. 608, pure azure straight K No. 510, green straight No 668, yellow straight ZhKh No 342, purple straight No 306, red straight Kh No 410, red straight 2S No 305, congo red No 360, straight black Z, No 671. The determination of the transparency near 254, 313, and 365 millimicrons has shown that the specimens of cloth, dyed different colors, do not transmit equally the ultraviolet rays, and there is no clearly pronounced relationship between the transpar-

Card : 1/2

K

USSR/Optics

Abs Jour: Referat Zhur-Fizika, 1957, No 4, 10644

ency to a colored cloth for ultraviolet rays and the color of the dye. Bibliography, 8 titles.

Card : 2/2

Tsvetykh, N.G.

24(4) PHASE I BOOK EXPLOITATION SOV/3140

Akademiya nauk Ukrainskoy SSR. Institut fiziki

Fotoelektricheskiye i opticheskiye yavleniya v poluprovodnikakh; trudy pervogo vsesoyuznogo soveshchaniya po fotoelektricheskim i opticheskim yavleniyam v poluprovodnikakh, g. Kiyev, 20-26 noyabrya 1957 g. (Photoelectric and Optical Phenomena in Semiconductors; Transactions of the First Conference on Photoelectric and Optical Phenomena in Semiconductors...) Kiyev, 1959. 403 p. 4,000 copies printed.

Additional Sponsoring Agency: Akademiya nauk SSSR. Prezidium. Komissiya po poluprovodnikam.

Ed. of Publishing House: I. V. Kisina; Tech. Ed.: A. A. Matveychuk; Resp. Ed.: V. Ye. Lashkarev, Academician, Ukrainian SSR, Academy of Sciences.

PURPOSE: This book is intended for scientists in the field of semiconductor physics, solid state spectroscopy, and semiconductor devices. The collection will be useful to advanced students in universities and institutes of higher technical training specializing in the physics and technical application of semiconductors.

COVERAGE: The collection contains reports and information bulletins (the latter are indicated by asterisks) read at the First All-Union Conference on Optical and Photoelectric Phenomena in Semiconductors. A wide scope of problems in semiconductor physics and technology are considered: photoconductivity, photoelectromotive forces, optical properties, photoelectric cells and photoresistors, the actions of hard and corpuscular radiations, the properties of thin films and complex semiconductor systems, etc. The materials were prepared for publication by E. I. Rashboy, O. V. Snitko, K. B. Tolpygo, A. P. Lubchenko, and M. K. Sheynkman. References and discussion follow each article.

Photoelectric and Optical Phenomena (Cont.) SOV/3140

Card 10/16

S/058/62/000/005/056/119
A057/A101

24:5000

AUTHORS: Lisitsa, M. P., Mayevskiy, V. M., Tsvelykh, N. G.

TITLE: Optical properties of thin films of some semiconductors

PERIODICAL: Referativnyy zhurnal, Fizika, no. 5, 1962, 6, abstract 5G46 (V sb. "Fotoelektr. i optich. yavleniya v poluprovodnikakh", Kiyev, AN USSR, 1959, 227-232)

TEXT: Quantitative data are presented on investigations of optical properties of Se and Te. Results are given on the investigation of phase shifts, which arise when light is reflected from the interface air-layer of Ag and Ge.

[Abstracter's note: Complete translation]

Card 1/1

TSVELYKH, N.G., Cand Phys Math Sci -- (d 19s) "Optical properties of the fine films of certain semiconductors." Kiev, 1959, 10 (Min of Higher Education UkSSR. Kiev State Univ im T.G. Shevchenko) 150 copies (KL, 26-59, 123)

SOV/51-7-4-19/32

AUTHORS: Lisitsa, M.P. and Tsvelykh, N.G.

TITLE: Thin-Layer Optics. V. Properties of Silicon

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 4, pp 552-557 (USSR)

ABSTRACT: Wedge-shaped layers of silicon, convenient for studies of the dependence of the optical constants on thickness, were prepared by vacuum sublimation. The layer thickness (d) varied from near zero to 1200 Å. Since tungsten, tantalum and molybdenum are all dissolved by liquid silicon, a carbon crucible was used in the form of a parallel plate of 0.5 mm thickness and 5-6 mm width. The original material contained up to 0.2% of impurities. To reduce the amount of impurities this material was melted several times in vacuo which removed the more volatile admixtures. The technique of measuring the transmission coefficient T (light incident from the layer side) and the reflection coefficients R and R' (light incident from the base side) was the same as that described earlier (Ref 4). Multiple reflections in the base were allowed for (Ref 5). The final value of T was correct, to within 5%; for R and R' the errors reached 10%. The transmission curves (T in %) are shown in Fig 1; here and in Figs 2, 3 and 4 curves 1, 2, 3, 4 represent measurements at the following four wavelengths: 580, 640, 700, 760 mμ. At d < 200 Å, the transmission coefficient T is

Thin-Layer Optics. V. Properties of Silicon

greater than 90% but with increase of d it falls gradually forming a wide minimum near d~600 Å. Position of this minimum is different for different wavelengths. Its displacement towards greater values of the thickness d on increase of wavelength shows that the minimum is due to interference. The same applies to a maximum at d~1000 Å. Two small maxima of T at d~200 Å are due to relaxation effects. The latter effects are also responsible for minima of R near d~200 Å (Fig 2); no such relaxation minima are observed on the R' curves (Fig 3) near d~200 Å. The dependence of R and R' on d is in general similar to that observed in the case of selenium and germanium layers. In all of them the interference maximum, which occurs at d~750 Å in silicon, is split into two components. This splitting is a structure effect: at thicknesses of 500-600 Å silicon layers are still "granulated" (discontinuous) and this is responsible both for the resonance extrema and splitting of the interference maximum. The absorption coefficient A is shown as a function of the thickness d in Fig 4. Below 420 Å the value of A was so small that it could not be measured. On increase of wavelength towards the infrared region the value of A was found to fall considerably. It is, therefore, suggested that silicon layers may be used to make non-absorbing multi-layer coatings, e.g. anti-reflection

Thin-Layer Optics. V. Properties of Silicon

coatings, for the infrared region. Abeles' formulae relating the values of T, R and R' and the optical constants n and χ (Ref 10) were found to be inapplicable in the case of thin silicon layers. Using a different method (Ref 11) the authors determined the refractive index n for comparatively thick layers of silicon ($d > 1000$ Å). The refractive index was calculated from

$$n = \frac{\lambda}{4(d_{min} - d_{max})} , \qquad (2)$$

where d_{min} and d_{max} are the thicknesses at which minima and maxima occur on the curves R(d) and R'(d). The calculated values of n are given in a table on p 556. For λ = 540 mμ n = 2.6-3.97, for 580 mμ n = 2.64-4.2, for 640 mμ n = 2.6-4.1 and for 760 mμ n = 2.71-4.32; the higher values of n correspond to lower layer thicknesses. The authors point out that the refractive index rises, in general, with increase of λ and that in thick layers the value of n is close to 3.5 reported for monocrystalline silicon (Ref 9). The authors found also that after several days the originally amorphous layers of silicon with $d > 900$ Å crystallized spontaneously; such crystallization did not occur in thinner layers ($d < 900$ Å). There are 4 figures, 1 table and 11 references, 7 of which are Soviet, 1 English and 3 French.

Card 3/3

SUBMITTED: February 17, 1959

LISITSA, M.P.; TSVELYKH, N.G.

Optics of thin layers. Part 4. Properties of germanium. Opt. i spektr. 5 no.5:622-624 N '58. (MIRA 11:12)
(Germanium--Optical properties)

SOV/ 4-3-24/30

AUTHORS: Lisitsa, M.P. and Gavrylyk, N.G.

TITLE: Optics of Thin Films. II. Properties of Tellurium. (Optika tonkogo sloya. II. Svoystva tellura.)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol.IV, Nr.3, pp. 373-377 (USSR)

ABSTRACT: Films of tellurium were prepared (by evaporation on glass plates) as wedges whose thickness varied from 0 to 1000 Å. The authors obtained curves of variation of the coefficients of reflection R (on the air-film side) and R' (on the glass-film side), the transmission coefficient T, the real (n) and imaginary (K) parts of the complex refractive index, with change of the film thickness d. Measurements of the reflection coefficients R and R' and of the transmission coefficient T were made using a monochromator UM-2. A silver-sulphide photoelement was used as the receiver. Measurements were made on freshly prepared films (up to one day old). The transmission coefficient T was measured with an error of 3%. The errors in measurement in R and R' were 2-6%. Calculations of n and K were made following

Card 1/3

51-4-3-14/30

Optics of Thin Films. II. Properties of Tellurium.

the Abeles method: from three measured quantities T, R and R' three unknowns n, K and d are found. Fig.1 gives the variation of the coefficients T, R and R' with thickness d. Fig.2 gives the variation of T and R with thickness d at three wavelengths: 700, 560 and 460 mμ. Figs.3 and 4 give the dependences of n and of K on film thickness d for the same three wavelengths as in Fig.2. Figs.5 and 6 give the dispersion (dependence on wavelength) of n and K for various film thicknesses from 45 to 370 Å. Fig.7 gives the absorption of energy (in %) by tellurium films as a function of film thickness. From the results obtained the authors make the following conclusions: (1) on deposition of tellurium on glass at room temperature, an amorphous film is formed up to about 30 Å; (2) with increase of thickness the amorphous phase is transformed into fine-grain crystalline structure with grain size increasing with increase of film thickness; this does not contradict conclusions from electrical properties of tellurium films and of electron diffraction and electron microscope investigations; (3) separate

Card 2/3

Optics of Thin Films. II. Properties of Tellurium.

grains join up to form a continuous film at about 400 Å; (4) resonance effects are observed in optical characteristics of thin films of tellurium; (5) since calculations of n and k carried out in the present paper were based on the theory which holds only for thick layers, the values of these quantities should be regarded as qualitative rather than quantitative. There are 7 figures and 6 references, of which 3 are Soviet, 2 French and 1 English.

ASSOCIATION: Kiyev State University imeni T.G. Shevchenko. (Kiyevskiy gosudarstvennyy universitet im. T.G. Shevchenko.)

SUBMITTED: June 3, 1957.

1. Tellurium films--Properties

Card 3/3

TSVELYKH, N. G.

25(6) PHASE I BOOK EXPLOITATION SOV/2555

Nauchno-tekhnicheskoye obshchestvo priborostroitel'noy promyshlennosti. Ukrainskoye respublikanskoye pravleniye

Novyye metody kontrolya i defektoskopii v mashinostroyenii i priborostroyenii [doklady Respublikanskoy konferentsii] (New Methods of Inspection and Flaw Detection in the Machinery and Instrument-manufacturing Industries [Reports of the Conference Held at Kiyev, 1956]) Kiyev, Gostekhizdat USSR, 1958. 264 p. 4,700 copies printed.

Sponsoring Agency: Akademiya nauk USSR.

Ed.: A. Amelin; Tech. Ed.: P. Patsalyuk; Editorial Board: I.I. Greben', B.D. Grozin, A.Z. Zhmudskiy, G.N. Savin (Resp. Ed.), I.D. Faynerman (Dep. Resp. Ed.), and A.A. Shishlovskiy.

PURPOSE: This book is intended for engineers, scientific workers, and technicians dealing with problems of inspection and flaw detection.

COVERAGE: This is a collection of scientific papers presented at a

Card 1/9

conference sponsored by the Academy of Sciences, UkrSSR, and the Nauchno-tekhnicheskoye obshchestvo priborostroitel'noy promyshlennosti, Ukrainskoye pravleniye (Ukrainian Branch, Scientific and Technical Society of the Instrument-manufacturing Industry). The papers deal with modern methods of inspection and flaw detection used in the machinery- and instrument-manufacturing industries. The subjects discussed include the use of electron microscopes in the investigation of metal surfaces; X-ray, gamma-ray, luminescense, magnetic, and ultrasonic methods of flaw detection; use of radioactive isotopes; X-ray diffraction methods of metal analysis; and the use of interferometers for measuring length and thickness and determining the coefficient of linear thermal expansion. No personalities are mentioned. References follow several of the papers.

Card 6/ 9

TSVELYKH, N.G

LISITSA, M.P.; TSVELYKH, N.G.

Optics of thin layers. Part 2: The properties of tellurium. Opt. i spektr. 4 no.3:373-377 Mr '58. (MIRA 11:4)

1. Kiyevskiy gosudarstvennyy universitet im. T.G. Shevchenko.
(Tellurium--Optical properties)

SOV/51-5-2-13/26

AUTHORS: Lisitsa, M.P., Mayevskiy, V.M. and Tsvelykh, N.G.

TITLE: Thin-Layer Optics (Optika tonkogo sloya). III. Properties of Selenium (III. Svoystva selena)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 2, pp 179-183 (USSR)

ABSTRACT: The paper gives results of measurement of the reflection coefficients and the transmission coefficient of selenium layers of various thicknesses. These layers were prepared by sublimation as described in Ref 1. Standard methods of measurement of the coefficients of reflection on the air side (R) and on the base side (R') and the transmission coefficient (T) were employed (see Ref 2). The authors used wedge-shaped plates with 1.52 refractive index for the sample supports. The coefficient R, R' and T were measured only for layers produced using a symmetrical evaporation source, but in the study of variation of the phase-shift δ a spherical evaporation source was used. The method of determination of δ was described in Ref 3. The errors in measurement of T reached 5% and those in measurement of R and R' were sometimes in excess of 10%. All measurements were made immediately after preparation of the layer, at four separate wavelengths in the visible region: 540, 595, 620 and 700 mμ. Calculations of n and K

Card 1/3

Thin-Layer Optics. III Properties of Selenium

(the refractive index and the absorption coefficient respectively) were made using Abeles' method described in Ref 4, except that the layer thickness d was measured independently (Ref 3). The results obtained may be divided into two groups. The first group includes δ, R, R', T and absorption A = 1 - R - T. All these parameters were obtained by direct measurements and they are subject to experimental errors only. The second group includes n and K, which were calculated using theoretical considerations, and therefore their values are affected by the approximations of the theory used. The results are given in Figs 1-6. In all figures, except Fig 5, the four wavelengths: 540, 595, 620 and 700 mμ are represented by curves marked 1, 2, 3 and 4 respectively. Figs 1 and 2 give the dependences of R and R' on the layer thickness d respectively. Figs 3 and 4 give the values of T and A as functions of d. Fig 5 gives the phase-shift δ as a function of the layer thickness d for one wavelength (546 mμ). The results obtained lead to the following conclusions. (A) The optical properties of selenium layers vary with thickness in a wide range of thicknesses. (B) In the range of

Card 2/3

Thin-Layer Optics. III Properties of Selenium

thickness studied here (up to 1000 Å) the coefficients R and R' behaved similarly. This indicates that there are considerable differences in the topography of the selenium layers at the boundaries air--layer and layer--glass. (C) The phase-shift δ depends on the form of the evaporation source used to prepare the selenium layers studied. The shape of this source affects the form and dimensions of the grains of which the layer is made. (D) The interaction of light with selenium layers near 160 Å in thickness is of resonance nature. There are 6 figures and 7 references, 3 of which are Soviet, 2 French, 1 German and 1 English.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet (Kiyev State University)

SUBMITTED: September 25, 1957

Card 3/3 1. Selenium films--Optical properties 2. Mathematics--Applications

TSVELYKH, N. G.

51-5-23/26

AUTHOR: Lisitsa, M.P. and Tsvelykh, N.G.

TITLE: Thin-layer Optics (Optika tonkogo sloya) I. Phase Shift on Reflection of Light from Thin Films of Silver, Germanium, Tellurium and Selenium. (I. Sdvig fazy pri otrazhenii sveta ot tonkikh plenok serebra, germaniya, tellura i selena)

PERIODICAL: Optika i Spektroskopiya, 1957, Vol.2, No.5, pp. 674 - 676 (USSR)

ABSTRACT: By thin films, the authors understand transparent or non-transparent layers whose properties depend on their thickness and differ from the properties of bulk samples. This paper studies quantitatively the phase-shifts of the reflected light for films of silver, germanium, tellurium and selenium when the thickness of these films changes. The phase-shift δ was studied on wedge-shaped samples. The samples were prepared by deposition in vacuum on glass plates. Purities of the materials deposited were as follows: silver - 99.98%, tellurium - 99.7%, selenium - 99.5%. The purity of germanium can be inferred from its resistivity which was 50 Ω.cm. The phase-shift is measured by the method described in Ref.7. Results are shown in Figs. 1 (silver), 2 (tellurium), 3 (germanium) and 4 (selen-
) In the figures, the thickness d is given in Å. All these results refer to reflection of [illegible] wavelength

Card 1/2

51-5-23/26

Thin-layer Optics I. Phase-shift on Reflection of Light from Thin Films of Silver, Germanium, Tellurium and Selenium.

Comparison of the four figures shows that in each case, at the lowest thicknesses, there is a phase-shift minimum. In addition to that minimum, there is at least one maximum of phase-shift for each substance. Silver differs from the other three semi-conducting substances by reaching a value $\delta = 1.2\pi$ at about 100 Å and this value does not materially vary with further increase in thickness. Semiconductors, on the other hand, show further minima and maxima in the phase-shift with increase in thickness. These differences may be related to the structure of the films (it is known that silver and tellurium films are crystalline, selenium and germanium are amorphous). The results quoted in this paper are not sufficient for firm conclusions on this point. There are 4 figures and 15 references, of which 6 are Slavic.

ASSOCIATION: Kiyev State University (Kiyevskiy Gosudarstvennyy Universitet)
SUBMITTED: January 7, 1957
AVAILABLE: Library of Congress
Card 2/2

LISITSA, M.P.;MAYEVSKIY, V.M.;TSVELYKH, N.G.

Thin layer optics. Part 3:Properties of selenium. Opt. i spektr. 5 no. 2:179-183 Ag '58. (MIRA 11:10)

1. Kiyevskiy gosudarstvennyy universitet.
(Selenium--Optical properties)

SOV/51-5-5-21/23

AUTHORS: Lisitsa, M.P. and Tsvelykh, N.G.

TITLE: Thin-Layer Optics. (Optika tonkogo sloya). IV. The Properties of Germanium (IV. Svoystva germaniya).

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 5, pp 622-624 (USSR)

ABSTRACT: Germanium layers were prepared by evaporation in vacuo from a tantalum boat. Other conditions of preparation of these layers are described in Ref 1. The technique of measurement of the reflection coefficients R (on the air side) and R' (on the substrate side), and of the transmission coefficient T is described in Ref 2. The effect of multiple reflections in the substrate was dealt with as described in Ref 3. All measurements were made on freshly prepared layers. The transmission coefficient T was measured within 5%. For R and R' the error did not exceed 10%. Fig 1 shows the dependence of the transmission coefficient T on thickness d (in Å). The four curves represent measurements at the following wavelengths: (1) 555 mμ, (2) 630 mμ, (3) 720 mμ and (4) 750 mμ. Fig 2 shows the dependence of the reflection coefficients R and R' on the layer thickness d. The four curves in each case were obtained at the wavelengths given in Fig 1. The absorption coefficient A = 1 - R - T is given in Fig 3 as a function of the layer thickness d (the four curves were obtained at the wavelengths given in

Thin-Layer Optics. IV. The Properties of Germanium.

Fig 1). From the experimental values of T, R and R' the real (n) and imaginary (K) parts of the complex refractive index $\tilde{n} = n - iK$ were determined. The method of calculation is given in Refs 2, 4. The results are shown in Fig 4 where curves 1 and 2 represent n for the wavelengths of 630 and 720 mμ respectively and curve 3 represents K. In the range of thicknesses from 300 to 500 Å the values of n and K obtained by the present authors are of the same order as those reported in Refs 5 and 6. There are 4 figures and 10 references, 6 of which are Soviet, 1 German, 1 French, 1 American and 1 English.

SUBMITTED: May 15, 1958

1. Germanium--Optical properties 2. Thin films--Preparation
3. Mathematics

Card 2/2

APPROVED FOR RELEASE: 04/03/2001 CIA-RDP86-00513R001757210019-8"

TSVELYKH, N. G.

LISITSA, M.P.; TSVELYKH, N.G.

Thin layer optics. Part 1. Phse shift of light reflected from thin films of silver, germanium, tellurium and selenium. Opt.i spektr. 2 no.5:674-675 My '57. (MIRA 10:7)

1. Kiyevskiy gosudarstvennyy universitet.
(Metallic films--Optical properties)

LISITSA, M.P.; TSVELYKH, N.G.

Interferential microscope for measuring thin coatings and the phase shift. Zav. lab. 22 no.9:1072-1075 '56. (MLRA 9:12)

1. Kiyevskiy gosudarstvennyy universitet imeni T. G. Shevchenko.
(Interferometry) (Microscope) (Metals--Testing)

CHEPUR, D.V.; TSVELYKH, N.G.

Polarization properties of spectroscopes. Zhur.tekh.fiz.25 no.3: 416-420 Mr '55. (MLRA 8:5)
(Spectroscopy) (Polarization (Light))

TSVELYKH, Nikolay Gavrilovich; MIRONETS, Ye.M., red.; OKOPNAYA, Ye.D., tekhn. red.

[Measurement of the thickness of thin films] Izmerenie tolshchin tonkosloinykh pokrytii. Kiev, Izd-vo Kievskogo univ., 1962. 30 p. (MIRA 15:8)
(Thickness measurement) (Metallic film)

TSVELODUB, T. F.

Tsvelodub, T. F.

"Investigation of the transparency of tissues to ultraviolet rays." Min Trade USSR. Moscow Inst of National Economy imeni G. V. Plekhanov. Moscow, 1956. (Dissertation for the Degree of Candidate in Technical Sciences.)

Knizhnaya letopis'
No. 25, 1956. Moscow

KLOPOTOV, B.; MANEVICH, L.; TSVENEV, V.

Combined premium-fixed wage system. Sots. trud no.4:117-123 Ap '57.
(Wages)

GURIN, L.Ye.; TSVENEV, V.L., inzh., retsenzent; PETROV, B.S., prof., doktor ekonom.nauk, red.; MIROSHNICHENKO, E.A., red.izd-va; BORODULINA, I.A., red.izd-va; SPERANSKAYA, O.V., tekhn.red.

[Wage paument system in a machinery manufacturing enterprise] Organizatsiia zarabotnoi platy na mashinostroitel'nom predpriiatii. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit. lit-ry, 1960. 178 p. (MIRA 13:11)
(Machinery industry) (Wage payment systems)

TSVENEV, V.L.

KLOPOTOV, B.Ye., inzhener; MANEVICH, L.M., inzhener; TSVENEV, V.L., inzhener.

Applying a bonus system to the payment of wages for regular assignments. Sudostroenie 23 no.4:37-39 Ap '57. (MLRA 10:5)
(Shipbuilding workers) (Wages)

BYAKOV, Miron Romanovich [deceased]; URETSKIY, Moisey Lazarevich; MINYAYEV, V.I., retsenzent; TSVENEV, V.L., retsenzent; SATANOVSKIY, Ya.S., nauchnyy red.; SHAKHNOVA, V.M., red.; KOROVENKO, Yu.N., tekhn. red.

[Operational planning in shipbuilding plants] Operativnoe planirovanie proizvodstva na sudostroitel'nom zavode. Leningrad, Sudpromgiz, 1963. 259 p. (MIRA 16:7)
(Shipbuilding--Management)

TSVENGER, S. I.
A. V. KUDINOV, Azerbaidzhanskoe Neftyanoe Khoz. 1940, No. 1, 39-43

TSVENKIN, D.Ya.; FEDIN, E.I.

Second moment of the nuclear magnetic resonance line in a sample with an axial texture. Zhur.strukt.khim. 3 no.1:101-102 Ja-F '62. (MIRA 15:3)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.
(Nuclear magnetic resonance and relaxation)

KLYUCHNIKOV, N.G.; TSVENKO, V.I., red.

[Manual on inorganic synthesis] Rukovodstvo po neorganicheskomu sintezu. Izd.2., perer. Moskva, Khimiia, 1965. 389 p. (MIRA 18:12)

TSVENTARNYY, A.K.

Mechanizing the feed of reamers. Mashinostroitel' no.8:28 Ag '62. (MIRA 15:8)

(Feed mechanisms)

S/182/63/000/001/006/012
A004/A126

AUTHORS: Zalesskiy, V. I., Tsventarnyy, A. M., Korneyev, D. M., Zhukov, A. A.

TITLE: Developing and studying an installation for hydraulically removing scale from heated blanks

PERIODICAL: Kuznechno-shtampovochnoye proizvodstvo, no. 1, 1963, 21 - 24

TEXT: The authors point out that, to improve the surface finish of die-forged parts, the hydraulic method of removing scale from the heated blanks is the most advanced one, and is used, apart from plants in the USA, England, Poland and other countries, also by machine-building and metallurgical plants of the Soviet Union, e.g. "Zaporozhstal'", "Krasnyy Oktyabr'", "Serp i molot" and other plants. This method consists in pointing a thin high-pressure water jet of some 100 - 180 atm at the blank heated up to forging temperature. Under the effect of the kinetic energy of the water and, simultaneously, of local cooling, the scale bursts and can be removed from the surface without the blank itself being cooled down. The two types of jet-forming devices, viz. spray nozzles and jet rings, are mentioned and functioning and operation of the latter is described

Card 1/2

Developing and studying an installation for...

in detail. The authors comment on the mechanized installation for hydraulic scale removal that was developed at the Nevskiy mashinostroitel'nyy zavod (Nevskiy Machine-Building Plant) and give a brief description of the main units. There are 6 figures.

Card 2/2

ZALESSKIY, V.I.; TSVENTARNYY, A.M.; KORNEYEV, D.M.; ZHUKOV, A.A.

Scale removal by hydraulic methods. Izv. vys. ucheb. zav.; chern. met. 6 no.3:135-140 '63. (MIRA 16:5)

1. Moskovskiy institut stali i splavov.
(Metals—Cleaning)

ZALESSKIY, V.I.; TSVENTARNYY, A.M.

Analyzing the performance of a stream race for cleaning billets from scale. Kuz.-shtam.proizv. 6 no.1:25-28 Ja '64. (MIRA 17:3)

ZALESSKIY, V.I.; TSVENTARNYY, A.M.; KORNEYEV, D.M.; ZHUKOV, A.A.

Developing and investigating equipment for the hydraulic removal of scale from hot ingots. Kuz.-shtam. proizv. 5 no.1:21-24 Ja '63. (MIRA 16:2)
(Metal cleaning) (Steel ingots)

DURDIN, Ya.V.; TSVENTARNYY, Ye.G.

Oscillographic investigation of the kinetics of cathodic hydrogen evolution in concentrated solution of hydrochloric and perchloric acids at the amalgamated copper electrode. Vest. LGU 17 no.10:117-128 '62. (MIRA 15:5)
(Electrolyte solutions)

S/054/60/000/02/10/021
B022/B007

AUTHORS: Durdin, Ya. V., Tseventarnyy, Ye. G.

TITLE: The Overvoltage of Hydrogen Evolution in Concentrated Sulfuric Acid Solutions on an Amalgamated Zinc Electrode

PERIODICAL: Vestnik Leningradskogo universiteta. Seriya fiziki i khimii, 1960, No. 2, pp. 80-92

TEXT: In previous papers (Ref. 1), the results obtained by investigating the overvoltage in the hydrogen evolution in concentrated hydrochloric acid- and hydrobromic acid solutions on an amalgamated zinc electrode are shown. In the present paper the overvoltage of hydrogen on an amalgamated zinc electrode in sulfuric acid of the concentrations 0.1 N, 1 N, 3 N, 5 N, 7 N and 10 N is measured by means of the usual- and the oscilloscopic method. The devices used and the methods employed were the same as in Ref. 1. Fresh sulfuric acid, which had been distilled twice or three times, was used. The polarization curves were recorded as in Ref. 1 by means of three different methods. The polarization curves of the dependence φ on log i recorded in 3 N sulfuric acid by means of a cathode millivolt-

Card 1/3

The Overvoltage of Hydrogen Evolution in Concentrated Sulfuric Acid Solutions on an Amalgamated Zinc Electrode

S/054/60/000/02/10/021
B022/B007

meter in the direction from greater polarizations to smaller ones, is given (Fig. 1). The curves φ - log i in H_2SO_4 given in Fig. 2, which were recorded by means of a cathode millivoltmeter, were plotted on the basis of the overvoltage determined on an amalgamated zinc electrode in 0.1 - 10 N sulfuric acid (Table 1) and on the basis of the data given in Table 2. Table 2 further gives the values of the potential of the equilibrium-hydrogen-electrode in corresponding H_2SO_4 solutions with respect to a normal hydrogen electrode. Table 3 gives the angular coefficients of the sections ab and bc. Table 4 gives the overvoltages in an 1 N H_2SO_4 solution and the current density of 0.1 a/cm^2 on an electrode made from mercury, amalgamated zinc and hard zinc. The change in the angular coefficient $\delta\varphi/\delta\log i$ with a polarization increase of the electrode and a variation in acid concentration is investigated. As shown by Fig. 3, the break of the curve φ - log i increases considerably after the addition of zinc ions. The influence exerted by the specific anion adsorption and the change in the Ψ_1-potential upon the discharge rate of hydrogen ions in sulfuric-, hydrochloric-, and hydrobromic acid is investigated. The data obtained for the quantities W, W', and $\Delta\Psi_1$, which were determined on

Card 2/3

the basis of the data for the amalgamated zinc electrode, are given in Table 5. The values W calculated from equation (8) are compared with the values W_{exp} determined experimentally in sulfuric acid with variable concentration (Table 6), where also the values obtained for W' calculated according to equation (9), are given. Satisfactory agreement between the values W calculated on the basis of equation (8) and the experimentally determined values W_{exp} follows also from the curves in Fig. 4. It is of interest to compare the data given by Table 6 with those in Table 7. In the latter, the values of W_{exp}, W^o, and W' are given, which correspond to the cathodic hydrogen evolution on the amalgamated zinc electrode in HCl and HBr. The values given in Table 7 were calculated on the basis of the results given in an earlier paper (Ref. 1). In Table 8 the values φ for a certain concentration interval of HCl and HBr are given. The following persons are mentioned: Z. A. Iofa and A. N. Frumkin (Ref. 3), Diploma Candidate of the kafedra elektrokhimii (Chair of Electrochemistry) V. Mal'tsev, A. N. Frumkin and collaborators (Ref. 9) and Bokris (Ref. 10). There are 4 figures, 8 tables, and 15 Soviet references.

DURDIN, Ya.V.; TSVENTARNYY, Ye.G.

Overvoltage of hydrogen evolution on an amalgamated zinc electrode in concentrated sulfuric acid solutions. Vest.LGU 15 no.10:80-92 '60. (MIRA 13:5)
(Overvoltage) (Hydrogen) (Electrodes, Zinc)

DURDIN, Ya.V.; TSVENTARNYY, Ya.G.

Overvoltage of the electrodeposition of hydrogen from concentrated solutions of hydrochloric and perchloric acids on an amalgam copper electrode. Vest LGU 16 no.16:85-96 '61. (MIRA 14:8)

(Hydrogen)
(Overvoltage)

DURDIN, Ya.V.; TSVENTARNYY, Ye.G.

Hydrogen overvoltage on an amalgamated zinc electrode in concentrated solutions of hydrochloric and hydrobromic acids. Vest.LGU 14 no.10:119-128 '59. (MIRA 12:6)
(Overvoltage) (Electrodes, Zinc)

5(4)

AUTHORS: Durdin, Ya. V., Tsventarnyy, Ye. G.

SOV/54-59-2-18/24

TITLE: Hydrogen Separation Overvoltage on an Amalgamated Zinc Electrode in Concentrated Hydrochloric-acid- and Hydrogen-bromide Solutions (Perenapryazheniye vydeleniya vodoroda na amal'gamirovannom tsinkovom elektrode v kontsentrirovannykh rastvorakh solyanoy i bromistovodorodnoy kislot)

PERIODICAL: Vestnik Leningradskogo universiteta. Seriya fiziki i khimii, 1959, Nr 2, pp 119-128 (USSR)

ABSTRACT: The investigation of the hydrogen overvoltage can give information on the rules and the mechanism of the influence of specific adsorptions of inorganic anions on the kinetics of electrode processes. There is, however, the difficulty of separating this influence from other influences such as change of concentration and effect of hydrogen ions on their discharge rates. Iofa and Frumkin (Refs 1-4) set up an equation for the rate of the cathodic H-separation process, in which they considered the above-mentioned influences. The equation corresponded qualitatively quite well to experimental observations. The degree of its quantitative accuracy is not yet sufficient,

Card 1/4

it was checked once more in the present paper. Amalgamated electrodes were used because of their relatively high freedom of other secondary influences (change of the active electrode surface, and change of the physical state). Besides, the polarization curves were plotted oscillographically in contrast to the usual method (Fig 6). The usually applied investigation method does not principally differ from the one described in the papers by Durdin and Kravtsov (Ref 6). The electric scheme consisted of the ordinary compensation scheme for the measurement of the electrode potential, a millivoltmeter, and an eight-loop oscillograph of the MPO-2 type. In order to eliminate the disturbing influences mentioned in the introduction, the polarization curves η - lg i were plotted by three different methods: 1) By a slow transition of these curves from high to low polarization, and vice versa, with 2-3 hours' staying on each current density until the constancy of the potential was attained. 2) The same in a time of 3-4 minutes by use of the cathode millivoltmeter. 3) By plotting the polarization curves from one point, i.e. waiting - at a given current density - for the potential constancy of the electrode, and then

Hydrogen Separation Overvoltage on an Amalgamated Zinc Electrode in Concentrated Hydrochloric-acid- and Hydrogen-bromide Solutions SOV/54-59-2-18/24

switching to lower current densities in a series of measurements. The potential jumps of the electrode are measured by an oscillograph. The results of measurement for hydrochloric-acid solutions in the concentration interval of 0.1 - 8 N are compiled in table 1 and in figures 1 and 2, for HBr-solutions in the interval of 0.1 - 5 N also in table 1 and in figure 3. The curves of HCl and $HClO_4$ on mercury electrodes are shown in figures 4 and 5 for comparison. The curves obtained consist of 2 parts, a linear one which only corresponds to the discharge of hydrogen ions, and one which corresponds to the simultaneous measurement of the hydrogen separation at the cathode and the discharge of zinc ions into the solution at the anode. The first part of the curve mentioned corresponds well to the equation by Tafel. At low concentrations, this value nearly corresponds to the theoretical one, it increases monotonously with an increase in concentration (in the HCl-solutions of the mentioned interval from 110 to 149, and in the HBr-solutions from 112 to 275 mv).

Card 3/4

Hydrogen Separation Overvoltage on an Amalgamated Zinc Electrode in Concentrated Hydrochloric-acid and Hydrogen-bromide Solutions SOV/54-59-2-18/24

The law observed can be explained by the specific adsorption of the anions (the adsorption of the anions specifically lowers the overvoltage of the hydrogen separation). There are 6 figures, 2 tables, and 11 references, 10 of which are Soviet.

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TSVERAVA, G. K.

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Abstract : The author discusses the above article critically and submits some of his own practical experiences.

Institution : None

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